» User Guide «

CP6004X-SA

6U CompactPCI Processor Board based on the 3rd Generation Intel® Core™ i7 Processor with the Intel® QM77 Express Chipset

Doc. ID: 1054-1227, Rev. 1.0
February 1, 2013

If it's embedded, it's Kontron.

Revision History

Publication Title:	CP6004X-SA: 6U CompactPCI Processor Board based on the 3rd Generation Intel® Core™ i7 Processor with the Intel® QM77 Express Chipset	
Doc. ID:	1054-1227	
Rev.	Brief Description of Changes	Date of Issue
1.0	Initial issue	1-Feb-2013

Imprint

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This symbol and title warn of hazards due to electrical shocks (> 60V) when touching products or parts of them. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your material.

Please refer also to the section “High Voltage Safety Instructions” on the following page.



Warning, ESD Sensitive Device!

This symbol and title inform that electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times.

Please read also the section “Special Handling and Unpacking Instructions” on the following page.



Warning!

This symbol and title emphasize points which, if not fully understood and taken into consideration by the reader, may endanger your health and/or result in damage to your material.



Note ...

This symbol and title emphasize aspects the reader should read through carefully for his or her own advantage.

For Your Safety

Your new Kontron product was developed and tested carefully to provide all features necessary to ensure its compliance with electrical safety requirements. It was also designed for a long fault-free life. However, the life expectancy of your product can be drastically reduced by improper treatment during unpacking and installation. Therefore, in the interest of your own safety and of the correct operation of your new Kontron product, you are requested to conform with the following guidelines.

High Voltage Safety Instructions



Warning!

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Caution, Electric Shock!

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Special Handling and Unpacking Instructions



ESD Sensitive Device!

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In order to maintain Kontron's product warranty, this product must not be altered or modified in any way. Changes or modifications to the device, which are not explicitly approved by Kontron and described in this manual or received from Kontron's Technical Support as a special handling instruction, will void your warranty.

This device should only be installed in or connected to systems that fulfill all necessary technical and specific environmental requirements. This applies also to the operational temperature range of the specific board version, which must not be exceeded. If batteries are present, their temperature restrictions must be taken into account.

In performing all necessary installation and application operations, please follow only the instructions supplied by the present manual.

Keep all the original packaging material for future storage or warranty shipments. If it is necessary to store or ship the board, please re-pack it as nearly as possible in the manner in which it was delivered.

Special care is necessary when handling or unpacking the product. Please consult the special handling and unpacking instruction on the previous page of this manual.

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Kontron grants the original purchaser of Kontron's products a ***TWO YEAR LIMITED HARDWARE WARRANTY*** as described in the following. However, no other warranties that may be granted or implied by anyone on behalf of Kontron are valid unless the consumer has the express written consent of Kontron.

Kontron warrants their own products, excluding software, to be free from manufacturing and material defects for a period of 24 consecutive months from the date of purchase. This warranty is not transferable nor extendible to cover any other users or long-term storage of the product. It does not cover products which have been modified, altered or repaired by any other party than Kontron or their authorized agents. Furthermore, any product which has been, or is suspected of being damaged as a result of negligence, improper use, incorrect handling, servicing or maintenance, or which has been damaged as a result of excessive current/voltage or temperature, or which has had its serial number(s), any other markings or parts thereof altered, defaced or removed will also be excluded from this warranty.

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Chapter **1**

Introduction

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1. Introduction

1.1 Board Overview

The CP6004X-SA (Standard Air-Cooled) is a highly integrated 6U CompactPCI system controller board based on the 3rd generation Intel® Core™ i7 processor combined with the mobile Intel® QM77 Express Chipset.

The board supports the Intel® Core™ i7-3615QE quad-core processor with 2.3 GHz built on 22-nm technology and provided in a BGA package. The processor is soldered on the CP6004X-SA which results in a higher Mean Time Between Failures (MTBF) and a significant improvement in cooling.

Two SODIMM sockets are available on the CP6004X-SA to provide up to 16 GB dual-channel, DDR3 memory with Error Checking and Correction (ECC) running at 1600 MHz. The graphics controller and the memory controller are integrated in the processor. Furthermore, either one 2.5" HDD/SSD or up to 64 GB NAND flash memory (SSD) via a SATA Flash module can be integrated onto the CP6004X-SA.

For maximum application flexibility, the CP6004X-SA comes with an extensive range of interfaces such as up to five Gigabit Ethernet ports (three on front I/O and two on rear I/O in compliance with PICMG 2.16), three high-resolution graphics interfaces (VGA, 2 x HDMI/DVI), two COM ports (RS-232 on front and rear I/O), and six SATA interfaces with RAID 0/1/5/10 functionality, one for the onboard SATA connector, one for the SATA Flash module or the 2.5" HDD/SSD, and four for rear I/O. In addition, six USB 2.0 ports are available on the board, two on front I/O and four on rear I/O.

Support for one XMC module ensures individual system expansion via the XMC interface utilizing a x8 lane PCI Express 2.0 interconnection.

The board supports a configurable 64-bit/66 MHz PCI or PCI-X hot swap CompactPCI interface. When installed in the system slot, the interface is enabled, and when installed in a peripheral slot, the CP6004X-SA is isolated from the CompactPCI bus.

In addition, the CP6004X-SA provides support for high-speed serial rear I/O interconnection via two 10GBASE-KR ports and one x4 PCI Express 2.0 port operating at up to 5 GT/s. In general, the high-speed serial rear I/O interconnection is capable of supporting two 10GBASE-KR/ 40GBASE-KR4 ports, one x8 PCI Express 3.0 port operating at 8 GT/s, and two SATA 6 Gb/s ports. The mechanical implementation and the signal definition of the high-speed serial rear I/O interconnection is compliant with the PICMG 2.20 specification. The CP6004X-SA is also compliant with the PICMG 2.16 specification and provides support for Kontron's latest 6U rear transition modules. The CP6004X-SA has been designed for use in a Kontron CompactPCI backplane based on the PICMG 2.20 and PICMG 2.16 specifications.

Safety and security features via a Trusted Platform Module (TPM) 1.2 are provided on request. Intelligent Platform Management Interface (IPMI) is supported as well.

Designed for stability, the board fits into applications situated in industrial environments, including I/O intensive applications where only one slot is available for the CPU, making it a perfect core technology for long-life applications. Components with high temperature tolerance have been selected from embedded technology programs, and therefore offer long-term availability.

The board is offered with various Board Support Packages including Windows, VxWorks and Linux operating systems. For further information concerning the operating systems available for the CP6004X-SA, please contact Kontron.

1.2 Board-Specific Information

The CP6004X-SA is a CompactPCI single-board computer based on the 3rd generation Intel® Core™ i7 processor and specifically designed for use in highly integrated platforms with solid mechanical interfacing for a wide range of industrial environment applications.

Some of the CP6004X-SA's outstanding features are:

- Support for the Intel® Core™ i7-3615QE (SV) quad-core processor, 2.3 GHz, 6 MB L3 cache
- Intel® QM77 Express Chipset
- Up to 16 GB, dual-channel, DDR3 SDRAM memory with ECC running at 1600 MHz on two SODIMM sockets
- Integrated 3D high-performance graphics controller with three high-resolution graphics interfaces (VGA, 2 x HDMI/DVI)
- 64-bit/66 MHz PCI or PCI-X CompactPCI interface (PICMG 2.0)
- One XMC slot utilizing a x8 lane PCI Express 2.0 interconnection
- Five Gigabit Ethernet interfaces:
  - Three Gigabit Ethernet interfaces on front I/O
  - Two Gigabit Ethernet interfaces on rear I/O (PICMG 2.16)
- Two Gigabit Ethernet (GbE) controllers:
  - One Intel® 82579LM Gigabit Ethernet controller connected to one GbE port on the front panel
  - One Intel® I350 quad-port Gigabit Ethernet controller connected to two GbE ports on the front panel and two GbE ports on the rear I/O
- Two 10 Gigabit Ethernet interfaces (10GBASE-KR) on the rear I/O (PICMG 2.20)
- One Intel® 82599 dual-port 10 Gigabit Ethernet controller
- Six SATA interfaces with SATA RAID 0/1/5/10 support:
  - One onboard SATA 6 Gb/s interface for the standard SATA onboard connector
  - One onboard SATA 6 Gb/s interface for either one SATA Flash module or one SATA 2.5" HDD/SSD
  - Four SATA 3 Gb/s interfaces on the rear I/O
- Six USB ports:
  - Two USB 2.0 ports on the front panel
  - Four USB 2.0 ports on the rear I/O
- Two COM ports:
  - One RS-232 COM port either on the front panel or on the rear I/O (COMA)
  - One RS-232 COM port on the rear I/O (COMB)
- TCG 1.2 compliant Trusted Platform Module (TPM), on request
- Two SPI boot flashes for two separate uEFI BIOS images:
  - One standard SPI boot flash
  - One recovery SPI boot flash
- Watchdog timer
- Battery-backed real-time clock (RTC)
- Three onboard DIP switches for board configuration
- Supports PICMG Packet Switching Backplane Specification 2.16
- IPMI support
- 4HP, 6U CompactPCI
- Passive heat sink solution for forced-airflow cooling
- Rear I/O on J3 and J5
- High-speed interconnect serial rear I/O on J4 and J41 (PICMG 2.20)
- Hot swap capability: as system controller or as peripheral device
- AMI Aptio®, a uEFI-compliant platform firmware

1.3 System Expansion Capabilities

1.3.1 XMC Module

The CP6004X-SA has one XMC mezzanine interface for support of x1, x4 and x8 PCI Express 2.0 XMC modules providing an easy and flexible way to configure the CP6004X-SA for various application requirements. For information on the XMC interface, refer to chapter 2.10.9, "XMC Interface".

1.3.2 CP6004X-SA-MK2.5SATA Assembly Kit

The CP6004X-SA comes with an optional CP6004X-SA-MK2.5SATA assembly kit comprised of one MMADP-SATA01 module and the necessary components needed for mounting the module on the CP6004X-SA. The MMADP-SATA01 module is required for connecting an onboard 2.5" SATA HDD or SSD to the CP6004X-SA via an onboard SATA extension connector. For further information concerning the MMADP-SATA01 module, please refer to Appendix A.

1.3.3 SATA Flash Module

The CP6004X-SA provides support for up to 64 GB NAND flash memory in combination with an optional SATA Flash module, which is connected to the CP6004X-SA via an onboard SATA extension connector. For further information concerning the SATA Flash module, please refer to Appendix B.

1.3.4 Rear I/O Module

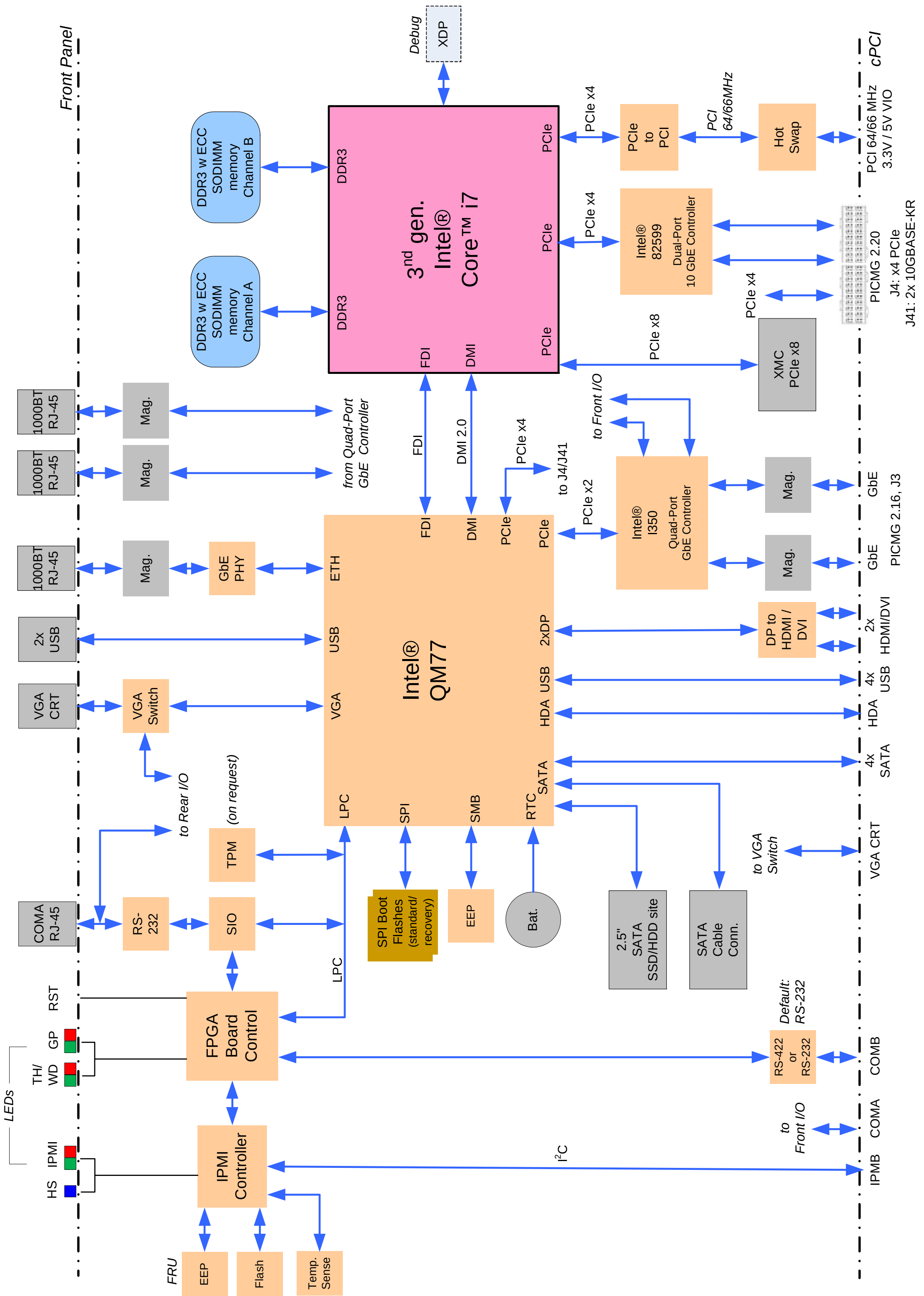
The CP6004X-SA provides support for one rear I/O module via the CompactPCI rear I/O connectors. For further information about the compatibility of rear I/O modules with the CP6004X-SA, please refer to the CP6004X-SA datasheet.

1.4 Board Diagrams

The following diagrams provide additional information concerning board functionality and component layout.

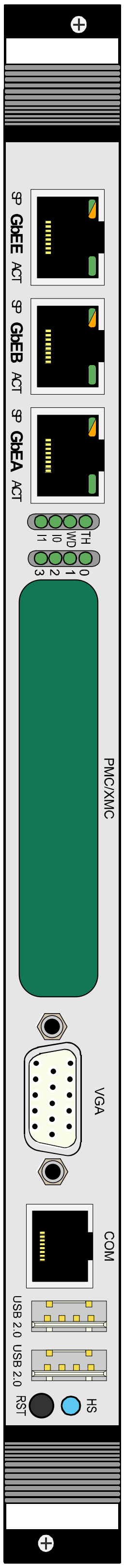
1.4.1 Functional Block Diagram

Figure 1-1: CP6004X-SA Functional Block Diagram



1.4.2 Front Panel

Figure 1-2: CP6004X-SA Front Panel



Legend

IPMI LEDs

I0/I1 (red/green):	Indicate the software status of the IPMI controller

Status LEDs

WD (green):	Watchdog Status
TH (red/green):	Temperature Status
HS (blue):	Hot Swap Control

Integral Ethernet LEDs

ACT (green):	Ethernet Link/Activity
SPEED (green/orange/off):	Ethernet Speed

General Purpose LEDs

LED 0..3 (red/green/amber):	General Purpose/POST code



Note ...

If the General Purpose LEDs are lit red during boot-up, a failure is indicated before the uEFI BIOS has started.

For further information, please contact Kontron.

1.4.3 Board Layout

Figure 1-3: CP6004X-SA Board Layout – Top View

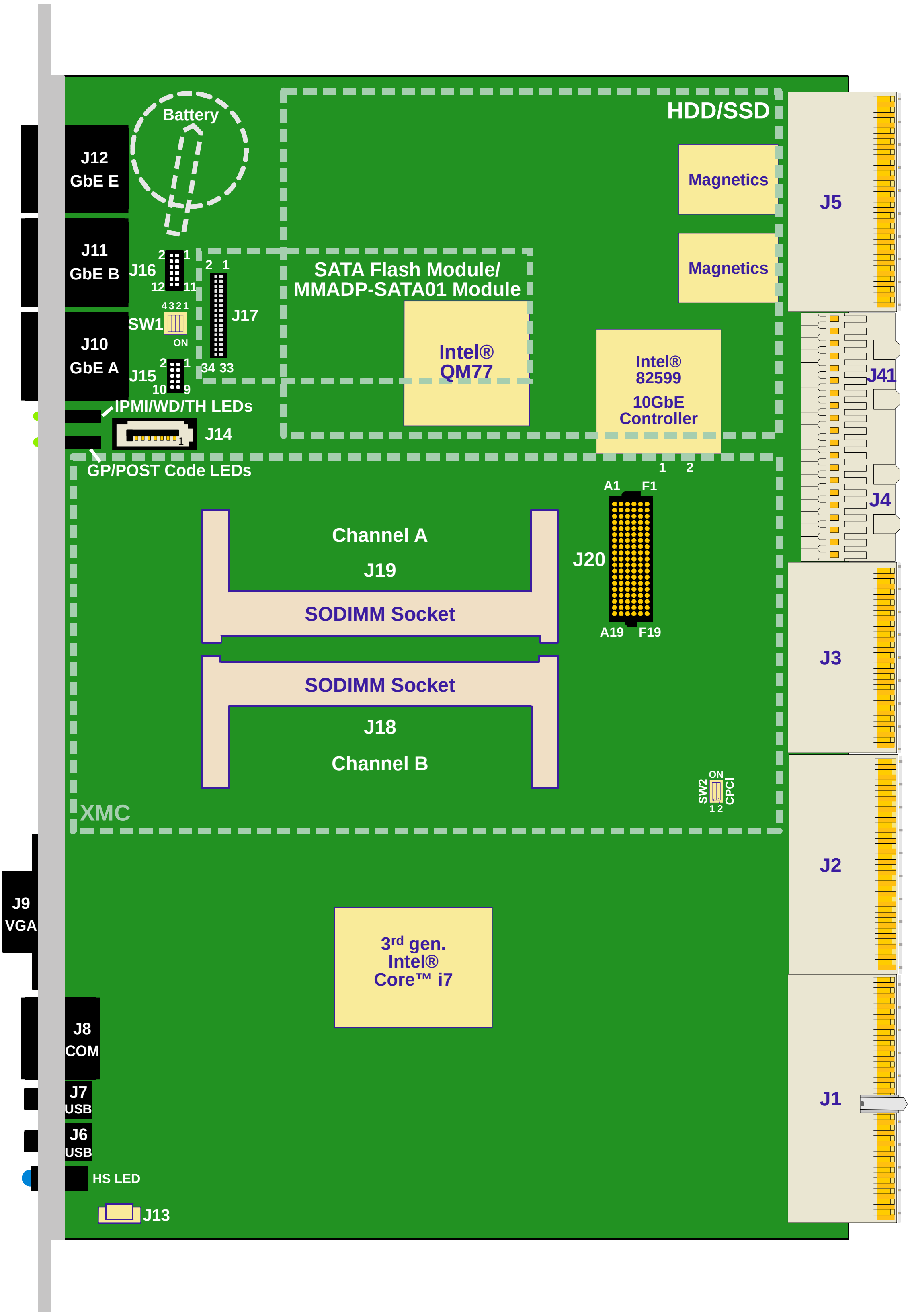
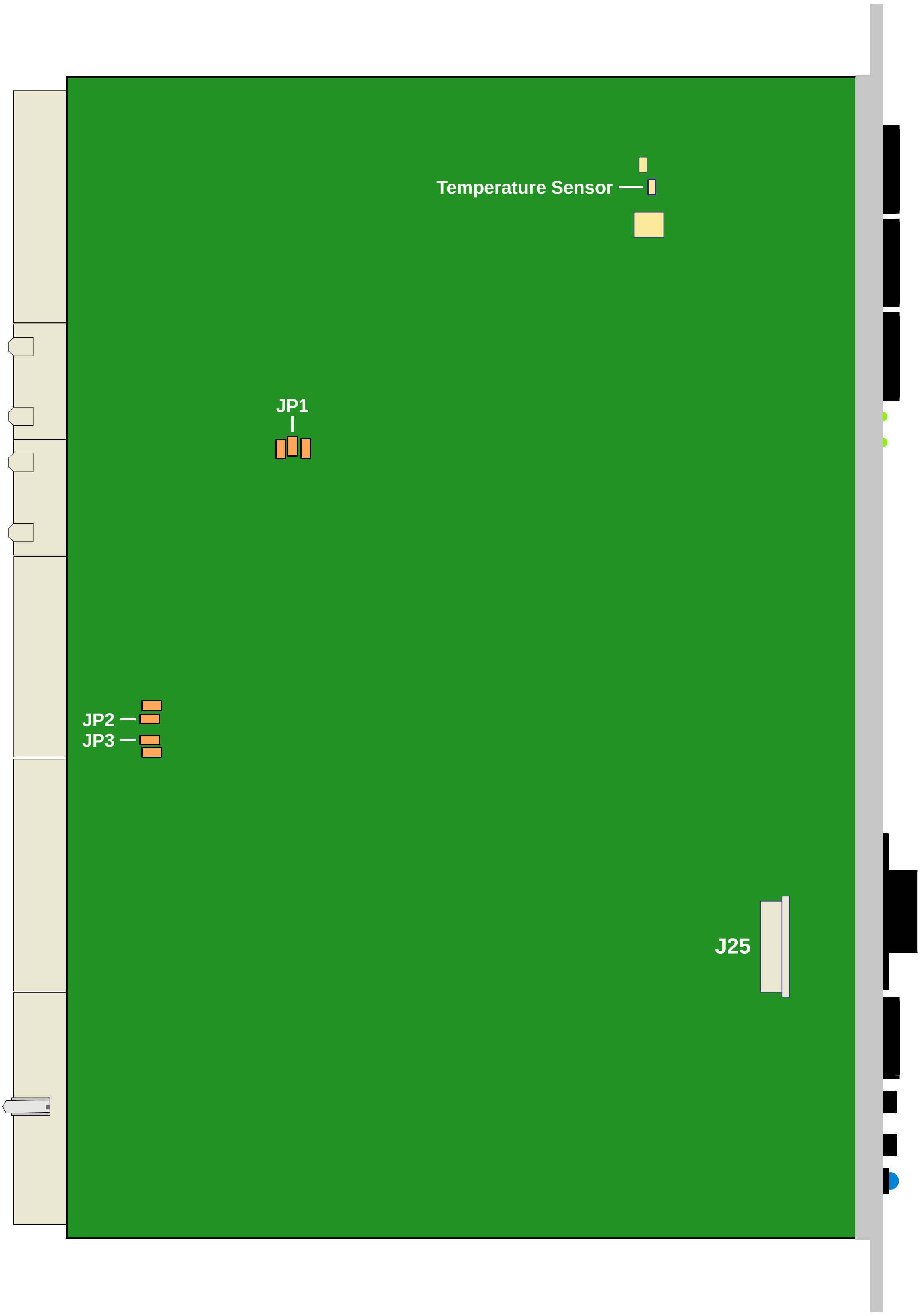


Figure 1-4: CP6004X-SA Board Layout – Bottom View



1.5 Technical Specification

Table 1-1: CP6004X-SA Main Specifications

FEATURES		SPECIFICATIONS
Processor and Memory	CPU	The CP6004X-SA supports the Intel® Core™ i7-3615QE (SV) quad-core processor with 2.3 GHz and 6 MB L3 cache Further processor features: • Up to four execution cores • Intel® Hyper-Threading Technology (Intel® HT Technology) • Intel® 64 Architecture • Intel® Advanced Vector Extensions (AVX) floating point • Intel® Turbo Boost Technology 2.0 • Intel® Intelligent Power Sharing (IPS) • System memory interface with optimized support for dual-channel DDR3 SDRAM memory at 1600 MHz with ECC • Integrated 2D and 3D Graphics Engines • DMI 2.0 with 5 GT/s and FDI interfaces to the Intel® QM77 Chipset • One x8 and two x4 PCI Express 2.0 ports operating at 5 GT/s Please contact Kontron for further information concerning the suitability of other Intel processors for use with the CP6004X-SA.
	Memory	Main memory: • Up to 16 GB, dual-channel DDR3 SDRAM memory with ECC running at 1600 MHz on two SODIMM sockets Cache structure: • 64 kB L1 cache for each core • 32 kB instruction cache • 32 kB data cache • 256 kB L2 shared instruction/data cache for each core • Up to 6 MB L3 shared instruction/data cache Flash memory: • Two SPI boot flash chips (2 x 8 MB) for two separate uEFI BIOS images • Up to 64 GB NAND flash via an onboard SATA Flash module (SSD) Serial EEPROM with 64 kbit

Table 1-1: CP6004X-SA Main Specifications (Continued)

FEATURES		SPECIFICATIONS
Chipset	Intel® QM77	Mobile Intel® QM77 Express Chipset: • Two x4 or eight x1 PCI Express 2.0 ports operating at 5 GT/s (only one x2 and one x4 PCI Express ports are used on the CP6004X-SA) • SATA host controller with six ports and RAID 0/1/5/10 support • Two SATA 6 Gb/s ports accessible via onboard connectors • Four SATA 3 Gb/s ports accessible via rear I/O • USB 2.0 host interface with up to 14 USB ports available (only six ports are used on the CP6004X-SA) • USB 3.0 host interface with up to 4 USB ports available (not used on the CP6004X-SA) • Integrated Ethernet controller • SPI flash interface support • Low Pin Count (LPC) interface • Power management logic support • Enhanced DMA controller, interrupt controller, and timer functions • System Management Bus (SMBus) compatible with most I²C™ devices • DMI 2.0 with 5 GT/s and FDI interfaces to the processor • High Definition Audio (HDA) interface • Analog display port • Three digital display ports • Integrated RTC
Integrated Controller	Graphics controller	High-performance 3D graphics controller integrated in the processor: • Supports analog displays (CRT) up to a resolution of 2048 x 1536 pixels with 32-bit color @ 75 Hz • Supports digital displays (HDMI/DVI) up to a resolution of 1920 x 1200 pixels @ 60 Hz • Dynamic Video Memory Technology (DVMT)
Interfaces	CompactPCI	Compliant with CompactPCI Specification PICMG 2.0 R 3.0: • System controller operation • 64-bit/66 MHz PCI or PCI-X master interface with dedicated PCIe-to-PCI-X bridge • 3.3V or 5V signaling levels (universal signaling support) Compliant with the Packet Switching Specification PICMG 2.16. The CP6004X-SA supports System Master hot swap functionality and application-dependent hot swap functionality when used in a peripheral slot. When used as a System Master, the CP6004X-SA supports individual clocks for each slot and the ENUM signal handling is in compliance with the PICMG 2.1 Hot Swap Specification. When installed in a peripheral slot, the CP6004X-SA is isolated from the CompactPCI bus. It receives power from the backplane and supports rear I/O and, if the system supports it, packet switching (in this case up to two channels of Gigabit Ethernet).

Table 1-1: CP6004X-SA Main Specifications (Continued)

	FEATURES	SPECIFICATIONS
Interfaces	Standard Rear I/O	The following interfaces are routed to the rear I/O connectors J3 and J5. • COMA (RS-232 signaling) and COMB (RS-232 signaling); no buffer on the rear I/O module is necessary • 4 x USB 2.0 • 1 x CRT VGA, 2 x HDMI/DVI • 1 x HDA • 2 x Gigabit Ethernet (compliant with PICMG 2.16, R 1.0) • 4 x SATA 3 Gb/s • 4 x GPIs and 4 GPOs (LVTTL signaling) • System write protection
	High-Speed Serial Rear I/O Interconnection	The following interfaces are provided on the rear I/O via two ZDplus high-speed connectors, J4 and J41 (PICMG 2.20): • Two 10GBASE-KR interfaces • One x4 PCI Express 2.0 operating at 5 GT/s as a root complex controller only The port mapping of the high-speed serial rear I/O interconnection on the CP6004X-SA is capable of supporting two 10GBASE-KR/40GBASE-KR4 interfaces, one x8 PCI Express 3.0 operating at 8 GT/s, and two SATA 6 Gb/s ports. However, the current implementation provides support for only two 10GBASE-KR and one x4 PCI Express 2.0 operating at 5 GT/s.
	10 Gigabit Ethernet	Two 10GBASE-KR interfaces for high-speed serial rear I/O interconnection based on the Intel® 82599 dual-port 10 Gigabit Ethernet controller
	Gigabit Ethernet	Five 10 Base-T/100 Base-TX/1000 Base-T Gigabit Ethernet interfaces based on one Intel® 82579LM Gigabit Ethernet controller and one Intel® I350 quad-port Gigabit Ethernet controller: • Three RJ-45 connectors on the front panel • Two ports on the rear I/O (PICMG 2.16) • Automatic mode recognition (Auto-Negotiation) • Automatic cabling configuration recognition (Auto-MDI/X)
	USB	Six USB ports supporting UHCI (USB 1.1) and EHCI (USB 2.0): • Two type A USB 2.0 connectors on the front panel • Four USB 2.0 ports on the rear I/O interface
	Serial	Two 16C550-compatible UARTs: • One RS-232 port on the front panel and routed to rear I/O, COMA • One RS-232 port on the rear I/O, COMB
	XMC	XMC interface: • One onboard XMC connector for connecting a standard XMC module • Up to x8 lanes PCI Express 2.0 ports operating at 5 GT/s
	SATA	Two SATA 6 Gb/s interfaces for: • Up to 64 GB flash memory via an onboard SATA Flash module, or • Onboard 2.5" HDD/SSD is supported in combination with the MMADP-SATA01 module • One standard SATA 6 Gb/s interface for the standard SATA connector Four SATA 3 Gb/s ports accessible via rear I/O

Table 1-1: CP6004X-SA Main Specifications (Continued)

FEATURES		SPECIFICATIONS
Sockets	Front Panel Connectors	• VGA: 15-pin, D-Sub connector, J9 • USB: two 4-pin, type A connectors, J6 and J7 • Ethernet: three 8-pin, RJ-45 connectors, J10, J11 and J12 • Serial port: one 8-pin, RJ-45 connector, J8 (COMA) • XMC front panel bezel cutout
	Onboard Connectors	• XMC connector, J20 (P15) • Two SATA connectors • One 7-pin, standard SATA connector, J14 • One 34-pin, SATA extension connector, J17 • JTAG connector, J16 • Debug connector, J15 • XDP-SFF (debug) connector, J25 • CompactPCI connectors J1, J2, J3 and J5 • ZDplus high-speed serial rear I/O connectors, J4 and J41 (PICMG 2.20) • Two 204-pin DDR3 SODIMM sockets, J18 and J19
Switches	DIP Switches	Two onboard DIP switches, SW1 and SW2 for board configuration
	Reset Switch	One front panel hardware reset switch
	Hot Swap Switch	One switch for hot swap purposes integrated in the front panel handle in accordance with PICMG 2.1 Rev. 2.0.
LEDs	System LEDs	System Status LEDs: • I0/I1 (red/green): Indicate the software status of the IPMI controller • WD (green): Watchdog Status • TH (red/green): Temperature Status • HS (blue): Hot Swap Control General Purpose LEDs: • LED 0..3 (red/green/amber): General Purpose / POST code
	Ethernet LEDs	Gigabit Ethernet Status: • ACT (green): Ethernet Link/Activity • SPEED (green/orange/off): Ethernet Speed
Timer	Watchdog Timer	• Software-configurable, two-stage Watchdog with programmable timeout ranging from 125 ms to 4096 s in 16 steps • Serves for generating IRQ or hardware reset
	System Timer	• The Intel® QM77 Chipset contains three 8254-style counters which have fixed uses • In addition to the three 8254-style counters, the Intel® QM77 Chipset includes eight individual high-precision event timers that may be used by the operating system. They are implemented as a single counter each with its own comparator and value register.

Table 1-1: CP6004X-SA Main Specifications (Continued)

FEATURES		SPECIFICATIONS
IPMI	IPMI Controller	• NXP® ARM7 microcontroller with redundant 512 kB firmware flash and automatic roll-back strategy • The IPMI controller carries out IPMI commands such as monitoring several onboard temperature conditions, board voltages and the power supply status, and managing hot swap operations. • The IPMI controller is accessible via two IPMBs (through the J1 and J2 connectors) and one host Keyboard Controller Style (KCS) Interface.
Thermal	Thermal Management	CPU and board overtemperature protection is provided by: • Temperature sensors integrated in the 3rd generation Intel® Core™ i7 processor: • One temperature sensor for monitoring each processor core • One temperature sensor for monitoring the graphics core • One temperature sensor for monitoring the package die temperature • One temperature sensor integrated in the Intel® QM77 Chipset for monitoring the chipset • One onboard temperature sensor for monitoring the board temperature • Specially designed heat sink
Security	TPM	Trusted Platform Module (TPM) 1.2 for enhanced hardware- and software-based data and system security (on request)
Software	uEFI BIOS	AMI Aptio®, AMI's next-generation BIOS firmware based on the uEFI Specification and the Intel Platform Innovation Framework for EFI. • LAN boot capability for diskless systems (standard PXE) • Redundant image; automatic fail-safe recovery in case of a damaged image • Non-volatile storage of setting in the SPI boot flash (battery only required for the RTC) • Compatibility Support Module (CSM) providing legacy BIOS compatibility based on AMIBIOS8 • Command shell for diagnostics and configuration • uEFI shell commands executable from mass storage device in a Pre-OS environment (open interface) • IPMI support in the command shell
	Software IPMI	IPMI firmware providing the following features: • The IPMI controller is accessible via up to two IPMBs, IOL and one KCS interface with interrupt support • The IPMI firmware can be updated in the field through all supported onboard interfaces using the update functions of the open-source tool “ipmitool”. For further information on the ipmitool refer to the sourceforge.net web site. • Two IPMI controller flash banks with automatic roll-back capability in case of an upgrade firmware failure • Board supervision and control extensions such as board reset, power and SPI boot flash control, etc.
	Operating Systems	The board is offered with various Board Support Packages including Windows, VxWorks and Linux operating systems. For further information concerning the operating systems available for the CP6004X-SA, please contact Kontron.

Table 1-1: CP6004X-SA Main Specifications (Continued)

FEATURES		SPECIFICATIONS
General	Mechanical	6U, 4HP, CompactPCI-compliant form factor
	Power Consumption	See Chapter 5 for details.
	Temperature Ranges	Operational: 0°C to +60°C Standard Storage: -40°C to +85°C Without hard disk and without battery  *Note ...* When a battery is installed, refer to the operational specifications of the battery as this determines the storage temperature of the CP6004X-SA (See "Battery" below).  *Note ...* When additional components are installed, refer to their operational specifications as this will influence the operational and storage temperature of the CP6004X-SA.
	Battery	3.0V lithium battery for RTC with battery socket. Battery type: UL-approved CR2025 Temperature ranges: Operational: -20°C to +70°C typical (refer to the battery manufacturer's specifications for exact range) Storage: -55°C to +70°C typical (no discharge)
	Climatic Humidity	93% RH at 40 °C, non-condensing (acc. to IEC 60068-2-78)
	Dimensions	233.35 mm x 160 mm
	Board Weight	799 g (without mezzanine cards)

1.6 Standards

The board complies with the requirements of the following standards:

Table 1-2: Standards

TYPE	ASPECT	STANDARD	REMARKS
CE	Emission	EN55022 EN61000-6-3	--
	Immission	EN55024 EN61000-6-2	--
	Electrical Safety	EN60950-1	--
Mechanical	Mechanical Dimensions	IEEE1101.10	--
Environmental	Climatic Humidity	IEC60068-2-78	93% RH at 40°C, non-condensing (see note below)
	WEEE	Directive 2002/96/EC	Waste electrical and electronic equipment
	RoHS 2	Directive 2011/65/EU	Restriction of the use of certain hazardous substances in electrical and electronic equipment
	Vibration (Sinusoidal)	IEC60068-2-6	Ruggedized version test parameters: • 10-300 (Hz) frequency range • 2 (g) acceleration • 1 (oct/min) sweep rate • 10 cycles/axis • 3 axes
	Single Shock	IEC60068-2-27	Ruggedized version test parameters: • 30 (g) acceleration • 9 (ms) shock duration half sine • 3 number of shocks per direction (total: 18) • 6 directions • 5 (s) recovery time
	Permanent Shock	IEC60068-2-29	Ruggedized version test parameters: • 15 (g) acceleration • 11 (ms) shock duration half sine • 500 number of shocks per direction • 6 directions • 5 (s) recovery time



Note ...

Kontron performs comprehensive environmental testing of its products in accordance with applicable standards.

Customers desiring to perform further environmental testing of Kontron products must contact Kontron for assistance prior to performing any such testing. This is necessary, as it is possible that environmental testing can be destructive when not performed in accordance with the applicable specifications.

In particular, for example, boards **without conformal coating** must not be exposed to a change of temperature exceeding 1K/minute, averaged over a period of not more than five minutes. Otherwise, condensation may cause irreversible damage, especially when the board is powered up again.

Kontron does not accept any responsibility for damage to products resulting from destructive environmental testing.

1.7 Related Publications

The following publications contain information relating to this product.

Table 1-3: Related Publications

PRODUCT	PUBLICATION
CompactPCI Systems and Boards	CompactPCI Specification PICMG 2.0, Rev. 3.0 CompactPCI Packet Switching Backplane Specification PICMG 2.16 Rev. 1.0 CompactPCI Packet Serial Mesh Backplane Specification PICMG 2.20 Rev. 1.0 CompactPCI System Management Specification PICMG 2.9 Rev. 1.0 CompactPCI Hot Swap Specification PICMG 2.1 Rev. 2.0
	IPMI - Intelligent Platform Management Interface Specification v2.0
	Kontron CompactPCI Backplane Manual, ID 24229
SATA	Serial ATA 1.0a Specification
XMC Module	ANSI/VITA 42.0-200x XMC Switched Mezzanine Card Auxiliary Standard ANSI/VITA 42.3-2006 XMC PCI Express Protocol Layer Standard IEEE 1386-2001, IEEE Standard for a Common Mezzanine Card (CMC) Family
Platform Firmware	Unified Extensible Firmware Interface (uEFI) Specification, Version 2.1
All Kontron products	Product Safety and Implementation Guide, ID 1021-9142
Kontron	CP6004-SA/CP6004X-SA uEFI BIOS User Guide
	CP6004-SA/CP6004X-SA IPMI Firmware User Guide

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